

# Network and Health: Research on the Formation Mechanism of Network Users' Health Knowledge System

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**Abstract:** In order to investigate what factors strengthen the construction of health knowledge system of Internet users and reveal the social impact of the fact that audiences' health knowledge system formed through the Internet. This paper investigates the relationship between health anxiety of Internet users and their autonomy of searching health knowledge from the perspective of the Use and Gratification Approach, and explored the relationship between health knowledge system of Internet users and medical cognition from the perspective of the Cognitive Balance Theory. This study used questionnaire method and a total of 168 valid questionnaires were collected. The study found that health anxiety and the Internet's precise push mechanism strengthen the construction of online users' knowledge system. At the same time, the study found that the audience's trust in offline medical care is reduced when they excessively acquire health knowledge and build their knowledge system through the Internet, which may lead to the phenomenon of doctor-patient "micro-conflict".

**Keywords:** Health knowledge system; Health communication; Use and satisfaction; Cognitive balance

## 1 Introduction

Since the 13th Five-Year Plan clearly put forward the concept of Comprehensive Health, people's demand for medical treatment and health care has begun to change from passive and responsive medical treatment to active and regular preventive health care. With the rapid development of the Internet, social media has gradually replaced traditional media as one of the important channels for people to obtain information and knowledge. Nowadays, social media platforms are also the main channels for users to carry out health communication.

Unlike the norm of "following doctor's orders" twenty years ago, a special phenomenon of "doctor-patient micro-conflict" frequently occurs in the consultation room nowadays: although patients go to the hospital, they have already formed a certain perception or even judgment about the cause of their illness. But their judgments often do not exactly match or even contradict the doctor's on-site diagnosis. As a result, patients and family members often refute the doctor's idea of the root cause of the disease in the consultation room. There are many reasons for this, from that patients and family members have the difficulty in accepting the reality of the situation to their concern that the doctor is deliberately exaggerating in order to receive red packets or excessive treatment. However, some patients and their families have developed a certain understanding of the disease and a certain cognitive system without seeking medical treatment.

We are curious about this: How do patients and families form their own cognitive system of illness and treatments without seeking medical attention? Is this system of knowledge about diseases scientific? What factors contribute to the formation of patients' "popularized" knowledge system? Why

do Internet users trust medical knowledge in social networks? How do patients' and their families' health cognitive systems change when doctor-patient knowledge collides?

## 2 Literature Review

### 2.1 An overview of the phenomenon of the Internet and health communication

The phenomenon of Internet health communication affecting the health knowledge systems of Internet users has attracted many scholars. It is mainly manifested in the following areas.

Firstly, studies have been conducted on the motivation, content, extent and influencing factors of different groups (e.g. patients, university students, parents of children, etc.) in using the Internet to obtain health information. Foreign scholar Redpath et al. (2006) studied the use of the Internet by homeless people and drug addicts, and discussed the possibility of providing them with health education through the Internet. Secondly, studies have been conducted on people's level of trust in health information on the Internet and the influence of health information on people's behaviour. For example, foreign scholars Oh, S. and Syn, S.(2015) have studied people's motivations for sharing information and providing social support for others on different social media through comparative analysis, and found 10 factors such as pleasure, self-efficacy and empathy. Thirdly, studies have focused on the health information and social support that occurs in cyberspace between specific groups (especially patient groups). Foreign scholar Coulson, N.(2005) studied 572 messages in online patient groups and found that patients provided each other with five types of social support online.

While, based on the perspectives of protection motivation and health literacy, domestic scholars Chen Ziwen et al.(2022) conducted a more detailed study on the antecedents of willingness of searching for health information in China, which showed that the likelihood of perceived threat, response efficacy, credibility of information sources, e-health literacy, and health mathematical ability had a significant positive effect on willingness to search for online health information. Besides, from the perspective of e-health literacy, domestic scholars Zhao Ye et al.(2018) have conducted a more detailed study on the relationship between the e-health literacy level of adult Internet users and online health information seeking behaviour from the perspective of e-health literacy.

Although these studies have examined the motivation of internet users in searching for health information as well as the content and its influence of internet health information, they have neglected the process of constructing the health knowledge system of internet users under the perspective of Use and Gratification Approach, as well as the reconstructing of the health knowledge system of internet users after the collision of healthy knowledge occurred between doctors and patients under the perspective of Cognitive Balance Theory.

### 2.2 An overview of the theories

#### 2.2.1 Use and Gratification Approach

The study of the use and gratification approach began in the 1940s, and research in the nascent period of the theory focused on examining the motivations of the public for using the media. Blumler, J. G. ,& Katz, E.(1974) further refined the theory in his book named *Personal Use of Mass Communication* and the basic model of "social elements + psychological elements - media expectations

- media exposure - satisfaction of needs" was proposed.

The research on use and gratification approach in China is mainly focused on the following four aspects. Firstly, the theory of use and gratification approach itself has been explored in depth. For example, Hu Yiqing and Zhang Jingyan (2019) published an article entitled *Critique of Functionalist View of Communication: Re-discussing Use and Gratification Approach*, in which they outlined the origin and development of use and gratification approach and pointed out three reasons why the theory has never grown into a real communication theory from the perspective of the philosophy of technology, i.e. the theory can only stay in the area of phenomenal analysis and generalization. Secondly, the analysis of media based on the perspective of use and gratification approach provides effective suggestions for its future development strategies. For example, in the article named *The Development of Mobile News Clients in the Context of Media Integration - Based on the Use and Satisfaction of Youth Groups* published in the Journal of Beijing University of Technology (Social Science Edition), Li Huajun and Zhang Waning(2018) examined the use and satisfaction of youth groups with news microblogs and news apps as the research objects and youth groups as the interviewees. Thirdly, the use and gratification approach is used to analyze the reasons for the popularity of a social phenomenon. For example, Xuefei Zhang and Yangli Gu(2018) published the article entitled *The Reasons and Implications of the Popularity of Papi under the Perspective of 'Use and Satisfaction Approach'*, in which they analyzed the characteristics and needs of Papi fans from the perspective of use and gratification approach, and also explored the reasons for Papi's popularity from the perspective of fans' needs. Fourthly, the use and gratification approach was used to analyse variety shows and films. For example, Wang Yajige(2018) published an article entitled *An Analysis of the Popularity of 'Trolling' Talk Shows from the Perspective of Use and Satisfaction - A Case Study of the Roast*, which analyzes how to attract audiences by analyzing the program setting, program format, and advertising of "Roast".

However, these studies did not examine the phenomenon of web users searching for health information through the Internet from the perspective of use and satisfaction approach. Therefore, they also did not answer the question about how Internet users form their health knowledge system.

### 2.2.2 Cognitive Balance Theory

Cognitive balance theory is an important theoretical school in Western social psychology, which was proposed by Austrian psychologist Fritz Heider(1958) in his book named *Psychology of Interpersonal Relations*. Its basic idea is that in daily life, people always tend to establish and maintain an orderly, connected and logical cognitive state, i.e. they strive to keep their cognitive system in a balanced state. Domestic scholars Fang Haiguang and Chang Zhi(2016) studied the laws of social learning networks based on the cognitive balance theory in the article entitled *A New Method for the Balanced Construction of Social Learning Networks*.

There are not too many studies to examine the phenomenon of doctor-patient micro-conflict that occurs when doctor-patient knowledge collides from the perspective of cognitive balance theory, and thus they does not answer the query of reconstructing the health knowledge system of network users after it is challenged.

## 2.3 Problem formulation

In summary, this paper will study the formation-mechanisms of the current online users' health system based on the use and gratification and cognitive balance theory and attempt to answer the following questions: What are the factors that enhance the construction of health knowledge system of online users? What are the social influences on the formation of health knowledge system by the audience through the Internet?

### **3 Research Method**

This paper uses the questionnaire method in an attempt to answer the above questions.

#### **3.1 Hypotheses**

H1: The greater the individual's health anxiety, the higher the autonomy of searching for health knowledge is likely to be.

H2: The higher the tendency of individuals to build health knowledge through the Internet, the lower the trust in offline medical care is.

To prove the two hypotheses, this study used a questionnaire method to sample the overall population and create a questionnaire.

#### **3.2 Sampling method**

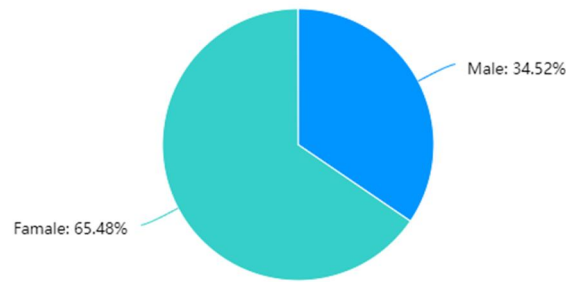
The study population corresponding to those hypotheses is the entire group of people who use the Internet to search for health information. The questionnaire was published online, and was distributed and collected through WeChat Moments, Weibo and Questionnaire Star database. The questionnaire was tested and passed the reliability and validity test, which can investigate and reflect the formation of health knowledge system formed by the Internet and its relationship with doctor-patient relationship. The questionnaires were randomly sampled and 168 questionnaires were collected during the distribution period, and 168 valid questionnaires were initially verified, i.e. a total of 168 respondents received this survey.

### **4 Research Findings and Discussion Points**

#### **4.1 Statistical analysis of the basic information of the respondents**

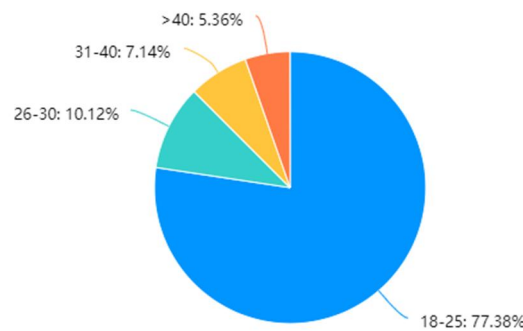
##### **4.1.1 Gender**

Among the 168 respondents, 110 were female, accounting for 65.48%, and 58 were male, accounting for 34.52%. There were more female respondents than male respondents.



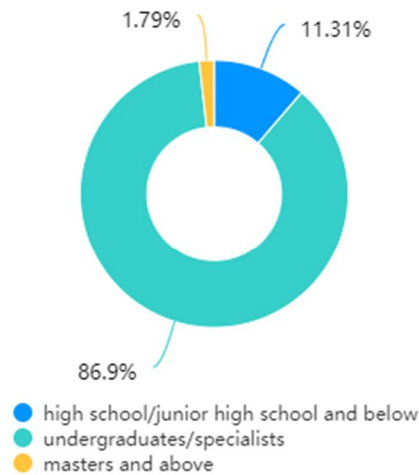
#### 4.1.2 Age

Since this questionnaire survey relies on the questionnaire star for the distribution of questionnaires, so the online questionnaire is the main way to answer questions, so the majority of respondents are young people. Among them, there are 130 people aged 18-25, accounting for 77.38% of the total sample; 17 people aged 26-35, accounting for 10.12% of the total sample; 7.14% of the total sample aged 31-40, and 5.36% of the total sample aged 40 and above.



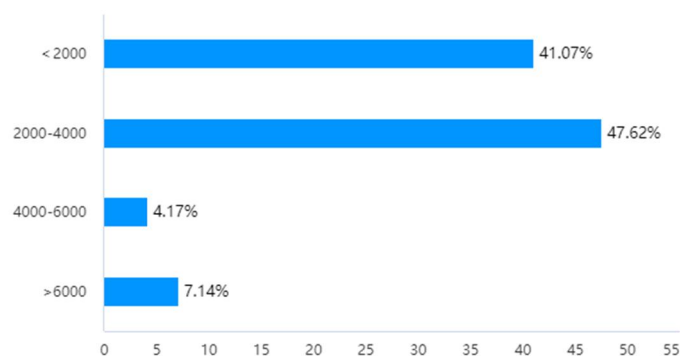
#### 4.1.3 Education level

Among the total 168 respondents, this study also investigated the educational level of the sample, with the largest proportion of undergraduates/specialists, 146 in total, accounting for 86.9% of the total sample. In addition, masters and above accounted for 1.79% of the sample size, and high school/junior high school and below accounted for 11.31%. The average education level of the 168 respondents in this study was high.



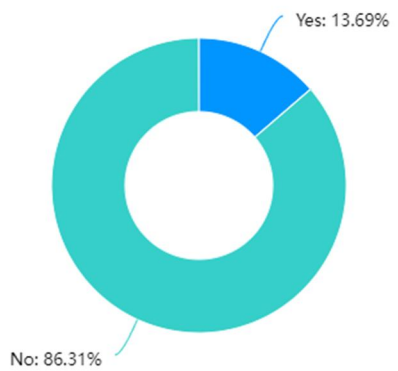
#### 4.1.4 Monthly consumption level

This study also investigated the monthly consumption level of all respondents. Among the 168 respondents, the consumption level interval was set low because of the presence of a student group among the respondents. After the survey, among the 168 respondents, 69 people (41.07% of all respondents) spent less than 2,000 yuan per month. 80 people (47.62% of all respondents) spent 2,000-4,000 yuan per month. In addition, 4.17% of the total sample spent between 4,000 yuan and 6,000 yuan per month, and 7.14% of the total sample spent more than 6,000 yuan per month. From this, it can be concluded that the monthly consumption level of the respondents participating in the survey is concentrated within the range of 2000-4000 yuan.



#### 4.1.5 Systematic learning of medical knowledge

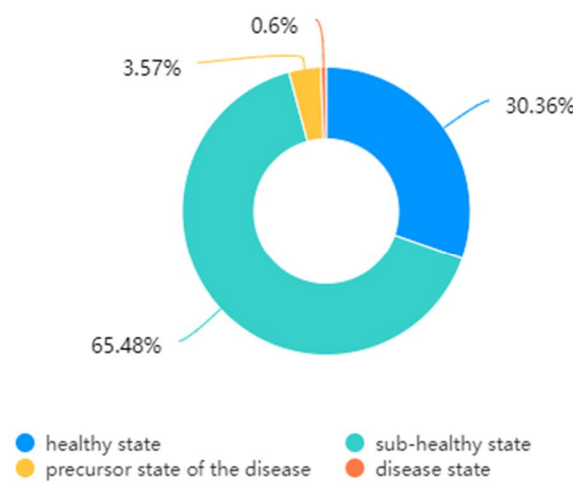
Since this study mainly examines the medical knowledge system established through the Internet, and considering that medical students are likely to cause certain analysis bias, the respondents were investigated whether they studied medical knowledge in colleges and universities. Of the total 168 respondents, 145, or 86.31% of the total sample, had not studied medical knowledge systematically in colleges and universities; only 13.69% had studied systematically in colleges and universities.



4.2 Analysis of respondents' health status and health anxiety

4.2.1 Health level of self-assessment

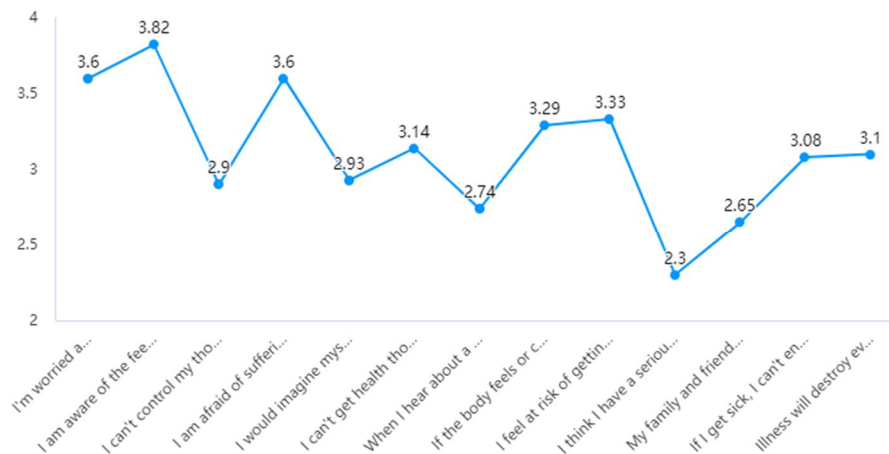
Considering that the source of the audience's medical knowledge system construction and the importance attached to it may be related, this study also investigated the health level of the respondents. Among them, 110 respondents considered themselves to be in a sub-healthy state, accounting for 65.48%. 51 considered themselves to be in a healthy state, accounting for 30.36%.



4.2.2 Analysis of health anxiety situation

Respondents' concern and anxiety about their own health may also lead to their attention to medical health knowledge, so this study also measured and analyzed respondents' own health anxiety. After statistical analysis, the overall anxiety level of respondents about their own health was 3.11 (out of 5), and the overall anxiety level was at a normal level. It is worth noting that the respondents were generally more concerned about their own condition, with the highest score of 3.82 for "I am aware of my body's feelings and changes", followed by "I am worried about my health" and "I am afraid of

having suffering from serious diseases", both with a score of 3.6. Respondents were more concerned about their own physical changes and worried about the occurrence of serious diseases. However, their self-perceptions are very clear and they rarely make preconceptions about their own illnesses.

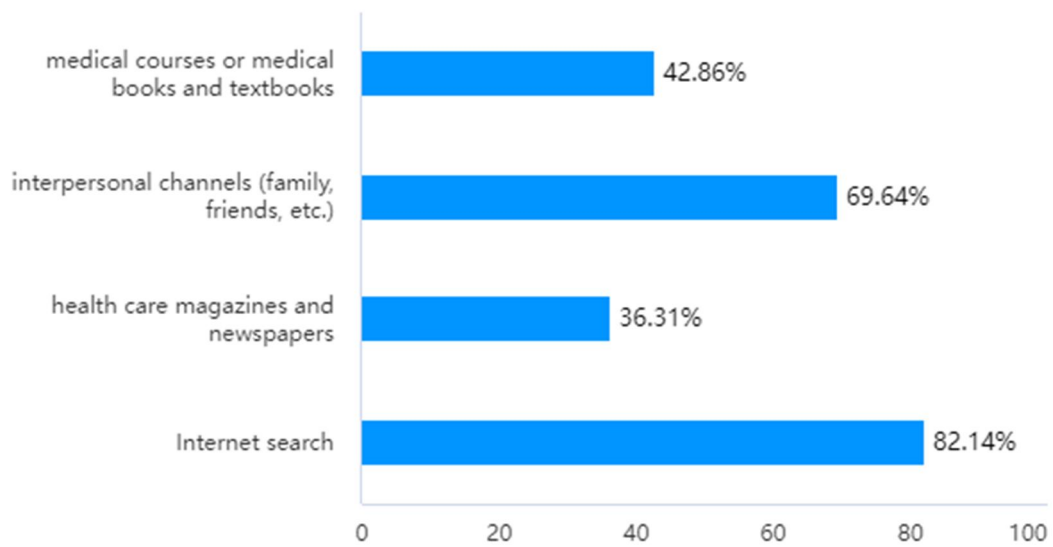


### 4.3 Statistical analysis related to the establishment of health knowledge system

#### 4.3.1 Internet is the main way to acquire health knowledge

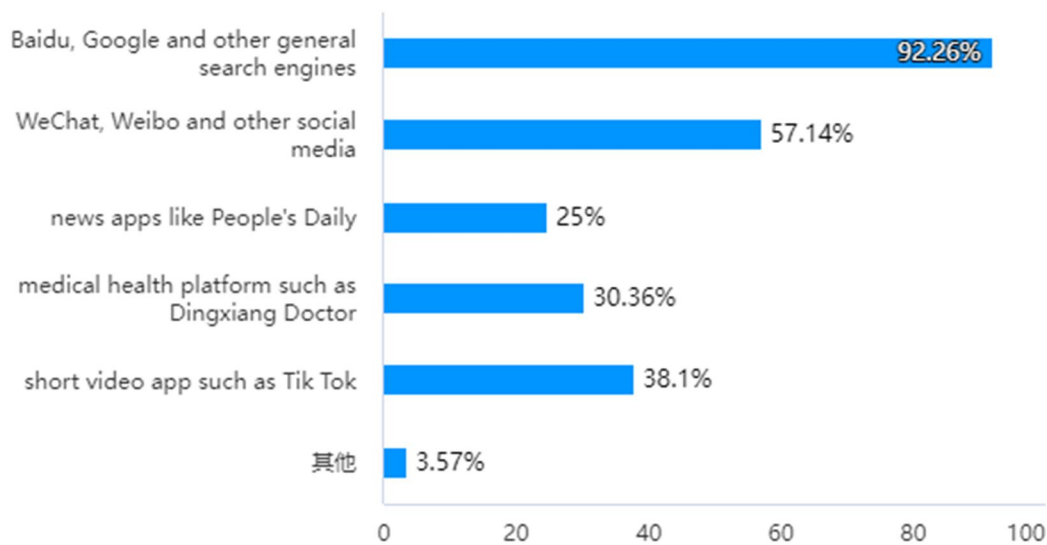
In order to investigate how the health knowledge system of the respondents was established, this study first investigated the ways of obtaining personal health knowledge of the respondents. Among all 168 respondents, 138 of them obtained their health knowledge from "Internet search", accounting for 82.14%. 117 of them obtained their health knowledge from "interpersonal channels (family, friends, etc.)", accounting for 69.64%. the rest The rest came from "medical courses or medical books and textbooks", accounting for 42.86%. And "health care magazines and newspapers", accounting for 36.31%. This shows that Internet search is indeed an important and main way to obtain personal health knowledge for contemporary people.





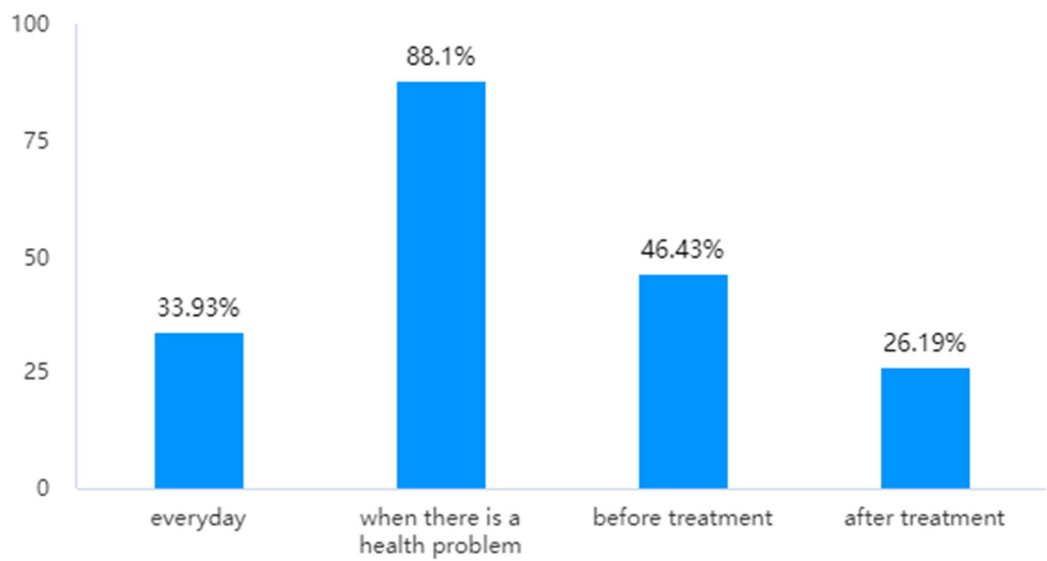
#### 4.3.2 Search engine is the first choice to obtain medical information, and social platform is the main channel

From the previous question, we further investigated and researched the online health information acquisition channels of audiences in the Internet, and subdivided the platform channels to help the subsequent study which is whether different channels have different influence on the formation of audiences' health knowledge system, and also help the corresponding platforms to build the health communication-related content system. Among them, "Baidu, Google and other general search engines" is the most commonly used online channel by the respondents, accounting for 92.26%, followed by "WeChat, Weibo and other social media", accounting for 57.14%. The third and fourth channels are "short video app such as Tik Tok" and "medical health platform such as Dingxiang Doctor", accounting for 38.1% and 30.36% respectively. This shows that search engines are still the first choice for audiences to establish a health knowledge system, and social media platforms are also important for health communication.



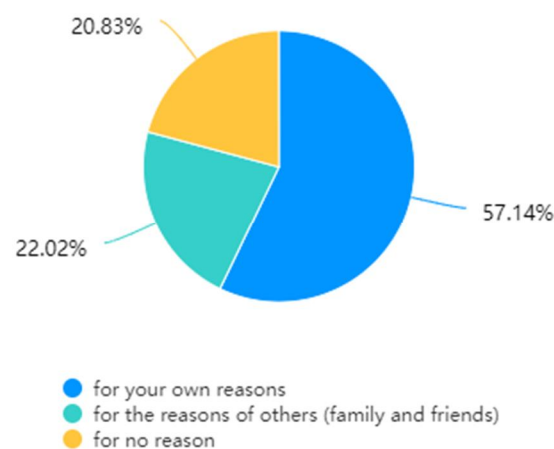
4.3.3 Health communication has a certain connection with scene demand

After analyzing the literature, it is found that health communication relying on the Internet medium currently has some connection with scene demand. Therefore, this study also investigated the scenarios in which respondents would use the Internet to search for health information. Among them, the number of "when there is a health problem" was 148, with the highest percentage of 88.1%, followed by "before treatment", with 46.43%. Some respondents also have the habit of searching "everyday", while some others search "after treatment". This shows that the audience has high requirements for the targeting and precision of health information.



#### 4.3.4 Motivation for searching health information is becoming more personalized

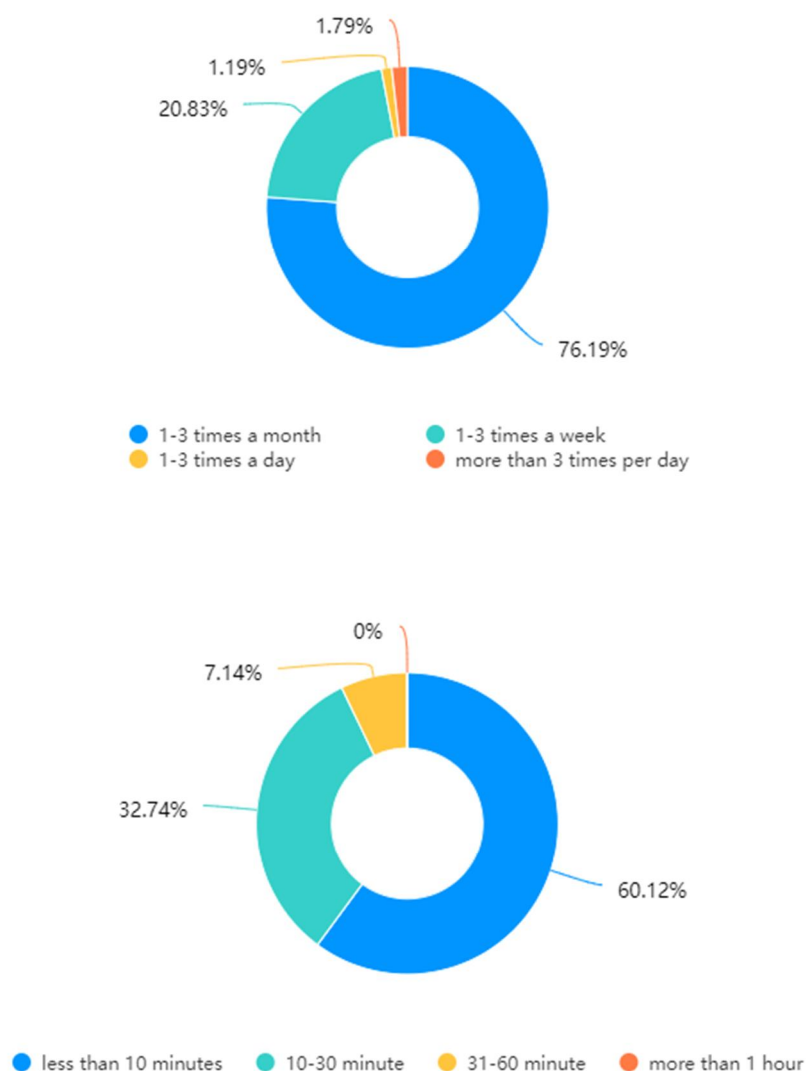
In this study, we investigated the motivation of health information search to determine the initial motivation of the audience to form a health knowledge system. According to the statistical analysis of the survey results, 96 people, or 57.14% of the respondents, searched for their own reasons. 22.02% searched for the reasons of others (family and friends). It can be concluded that most of the audiences' health knowledge system depends on their own health conditions, and the opportunity of forming the knowledge system has strong personalized characteristics, so its content may also show personalized deviations.



#### 4.3.5 Frequency and duration of health knowledge acquisition

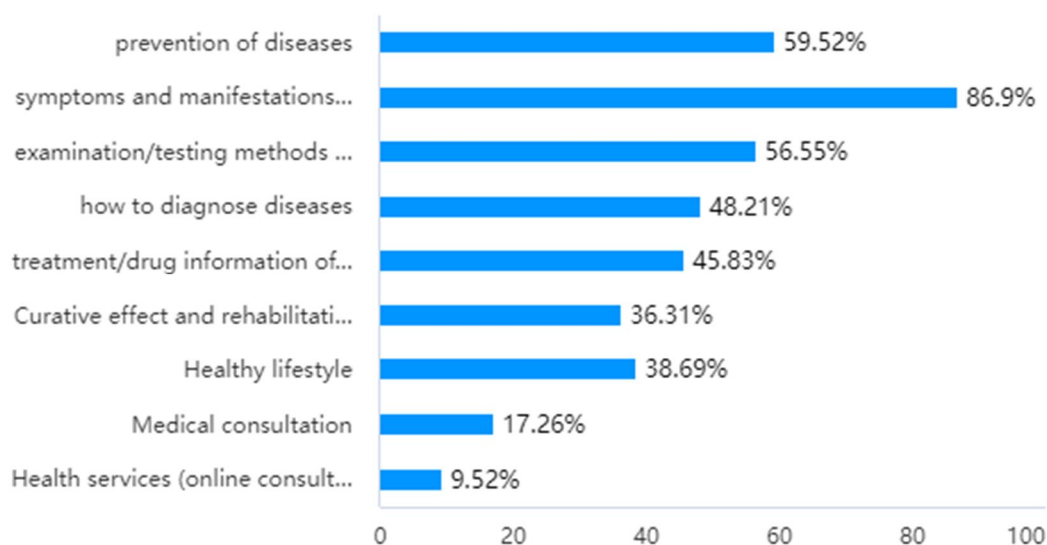
The formation of health knowledge system is also related to the frequency and length of browsing and searching health knowledge. In terms of frequency, 128 respondents, or 76.19%, searched 1-3 times a month. 20.83% searched 1-3 times a week. The frequency of health information search for the entire sample remained at a level measured in months.

The length of each search for health information was less than 10 minutes for 60.12% and 10-30 minutes for 32.74% of the respondents. It can be seen that the vast majority of the audiences carry out the establishment of health knowledge system basically by using fragmented time to accumulate the system little by little, rather than systematically and massively inputting health knowledge.



#### 4.3.6 Main contents of health knowledge system

After exploring how the health knowledge system is established, this study also investigated and analyzed the main contents of the health knowledge system. Among them, 86.9% of the respondents searched for "symptoms and manifestations of diseases", "prevention of diseases" and "examination/testing methods of diseases", accounting for 59.52% and 56.55% respectively, followed by 48.21% for "how to diagnose diseases" and 45.83% for "treatment/drug information of diseases". The search volume of health services and medical consultation such as online consultation was the lowest. From this analysis, the content of the audience's health knowledge system focuses more on disease prevention, self-judgment and simple self-diagnosis and treatment. The trust level related to online consultation is low.

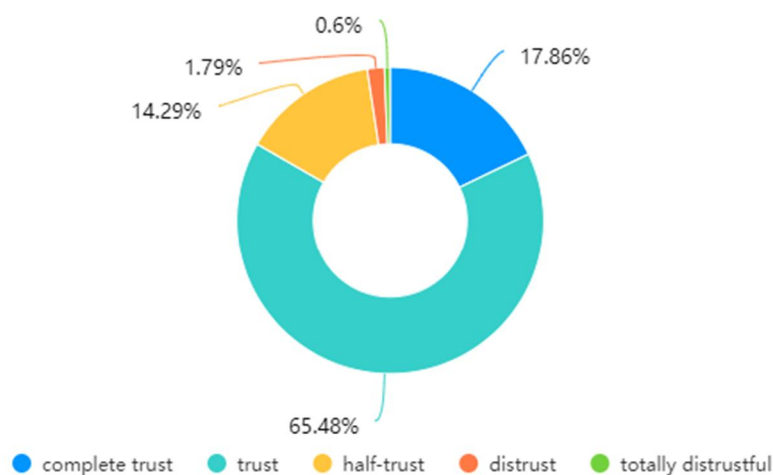


#### 4.4 Statistical analysis of respondents' health knowledge system and medical-related perceptions

In addition to the statistical analysis of the respondents' basic information, this study also hopes to analyze whether there is a connection between the audience's health knowledge system and their medical-related perceptions. This research study divides medical-related perceptions into several directions: trust in doctors, perceptions of medical diagnosis results, and perceptions of doctors' misdiagnosis.

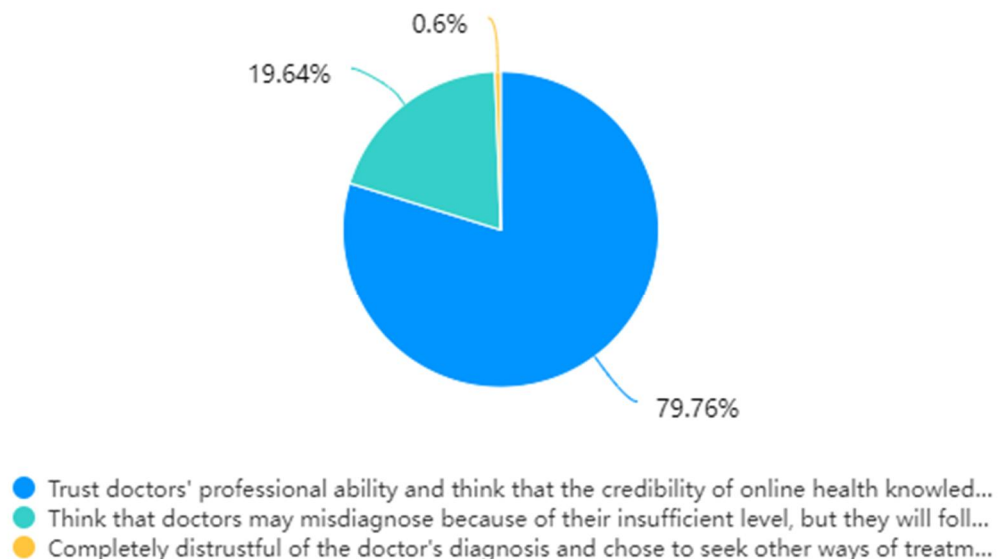
##### 4.4.1 Internet users still have trust in doctors

In the survey on trust in doctors, 65.48% of the respondents had "trust". And the highest trust level was 17.86%, while 14.29% had "half-trust" in doctors. The trust level of the sample in doctors is relatively concentrated, and the degree is in the middle.



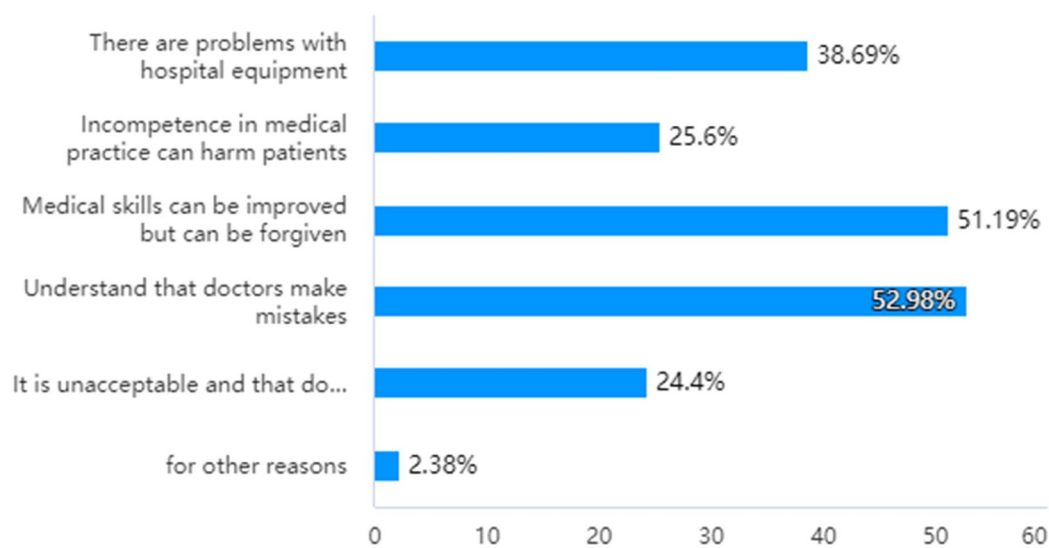
#### 4.4.2 Internet users' trust in doctors' diagnostic results is high

Because of the massive and complex information on the internet and the extremely large number of symptoms and internal or external influencing factors of health diseases, therefore, there are also many cases that the diagnosis results of doctors in reality are inconsistent with the results of online inquiries. When the health knowledge system established by the Internet deviates from the diagnosis results of professionals, the audience may have cognitive bias. According to the survey, 79.76% of the respondents "trust doctors' professional ability and think that the credibility of online health knowledge information is low". Another 19.64% of the respondents "think that doctors may misdiagnose because of their insufficient level, but they will follow doctors for treatment temporarily ". It can be seen that almost all of the audience will first cooperate with the doctor's treatment for the medical diagnosis results in reality, but there are a few users who question the doctor's diagnosis results because of the health knowledge system they have built up through the Internet.



#### 4.4.3 Internet users' perception and attitude toward misdiagnosis

Among the above diagnostic results, 19.64% of the respondents "think the doctor may have misdiagnosed the patient because of his or her insufficient level, but will temporarily follow the doctor for treatment". In this study, 52.98% of the respondents said that they "understand that doctors make mistakes", 51.19% said that "their medical skills should be improved but mistakes can be forgiven", and 38.69% of the respondents said that "there are problems with hospital equipment". In addition, 25.6% of the respondents thought that "incompetence in medical practice can harm patients" and 24.4% of the respondents thought that "it is unacceptable because doctors' misdiagnosis can harm patients". It can be seen that about half of the respondents understand and accept the misdiagnosis, but a small number of them have a strong attitude that they cannot agree with the misdiagnosis.



#### 4.4.4 Health knowledge system construction and medical cognition

In order to further investigate and study the relationship between health system construction and medical cognition, this study conducted a cross-tabulation analysis of the two variables. After data statistical analysis and processing, it can be seen that Internet users in the construction of health knowledge system attach importance to the knowledge centered on their own physical conditions, with strong personalized characteristics. Acquiring health knowledge too frequently will lead to distrust of medical cognition, especially doctors' diagnosis results. And more intense reactions on medical issues such as misdiagnosis will be produced. The situation of medical cognition is smoother when users acquire health knowledge and establish a knowledge system moderately.

#### 4.4.5 The health knowledge system established by users originates from their own needs

Nowadays, Internet search has been the main way for contemporary people to acquire personal health knowledge, among which search engines are the first choice for audiences to establish health knowledge systems, and social media platforms are also important battlegrounds for health communication. From the survey, it can be seen that people's concern and anxiety about their own health will lead them to attach importance to medical health knowledge. Based on their own health conditions, Internet users will actively search for channels to search and acquire health knowledge to relieve their anxiety about health.

In investigating the establishment of health knowledge system of Internet users, the author found from the theory of use and satisfaction that audiences have higher requirements for the targeting and segmentation precision of health information. And the construction of their health knowledge system mostly relies on their own health conditions. Besides, the opportunity of forming the knowledge system has strong personalized characteristics, therefore its content may present personalized deviations. Based on the mechanism of information cocoon, the Internet will precisely recommend the knowledge searched by audiences and bring a large amount of knowledge on the same topic, which further accelerates the formation of the Internet-based knowledge system. At the same time, the formation of health knowledge system is also related to the

frequency and length of their browsing and searching for health knowledge. The survey finds that most of the audiences basically use fragmented time to build a health knowledge system by forming a system bit by bit, rather than inputting health knowledge systematically and on a large scale, so the knowledge system formed by most of the audiences' search is still popular, and there is no guarantee that it is scientific and perfect.

4.4.6 The cognitive balance between users and social networks can also bring about doctor-patient micro-conflicts

The knowledge system constructed based on social networks and accurate recommendation makes users form a positive relationship with social networks. According to Heidegger's cognitive balance theory, this solid positive relationship becomes the source of doctor-patient micro-conflicts during people seeking medical advice. In the statistical analysis of respondents' health knowledge system and medical cognition, we can see that people attach importance to the construction of health knowledge system centering on their own body conditions, which has strong personalized characteristics. However, when people acquire health knowledge too frequently, they may have distrust in medical cognition, especially in doctors' diagnosis results, and thus have more intense reactions to medical issues such as misdiagnosis, which forms the phenomenon of medical "micro-conflicts" in our society nowadays. Therefore, users can acquire health knowledge and establish a knowledge system in an appropriate manner to make the audience's medical perception stable.

## 5 Significance of the Construction of Online Health Knowledge System

This study theorizes the phenomenon of the construction of health knowledge system of Internet users by questionnaire method from the perspective of use and satisfaction theory and cognitive balance theory, and tries to answer the following questions. What factors strengthen the construction of health knowledge system of Internet users? What are the social influences on the formation of health knowledge systems by the audience through the Internet? The study found that personal health anxiety and the Internet's precise recommendation mechanism strengthen the construction of online users' knowledge system, among which the greater the personal health anxiety, the higher his or her autonomy of searching for health knowledge online. Besides, the audience's trust in offline medical care will be reduced when they excessively acquire health knowledge and build their knowledge system through the Internet, which will lead to the phenomenon of doctor-patient "micro-conflict".

This study proposes a mechanism for the formation of users' online health knowledge system, which reflects the development of the knowledge system construction of the audience about the Internet health communication phenomenon. In addition, it also provides a very efficient and convenient way to popularize health knowledge in modern China in the context of mediated society. At the same time, the formation of the online health knowledge system has also become a non-institutionalized push for medical system reform. However, it is worth noting that this study also found that the phenomenon of users constructing their own health knowledge system through the Internet has the negative impact of "micro-conflicts" between doctors and patients, and excessive conflicts can be one of the reasons for wasting medical resources, which is worth warning.

However, there are still some limitations in this study. In terms of research perspectives, this paper focuses on the motivations for the generation of audiences' willingness to search for health knowledge, the



factors that promote the formation of audiences' online health knowledge system, and the impact on the doctor-patient relationship after forming an online health knowledge system. In future research, researchers in the field of health communication may need to pay more attention to the impact of the variability in the nature of Internet health information dissemination on the formation of audiences' health knowledge system, as well as to expand the research and practice on the construction of Internet users' health knowledge system from the perspectives of communicators and media. In terms of survey methods, this study only used the questionnaire method. And it only investigated a single type of audience. So the conclusions lacked of universality .

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